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ONTARIO WATER
RESOURCES COMMISSION

ANNUAL REPORT 1965

# DUNNVILLE

## (REGIONAL)

## water treatment plant

TD
227
D86
D86
1965

c.1
a aa

DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Dunnville Local Advisory Committee,
Dunnville, Ontario.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Dunnville Regional Water Treatment Plant, OWRC Project No. 58-W-17.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water treatment.

Yours very truly,

D. S. Caverly,
General Manager.

TD/227/D86/D86/1965/MOE
ASM2

ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the Dunnville Regional Water Treatment Plant, OWRC Project No. 58-W-17.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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RESOURCES COMMISSION

# FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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# DUNNVILLE REGIONAL
## water treatment plant

operated for

THE TOWN OF DUNNVILLE

SHERBROOKE METALLURGICAL COMPANY LIMITED

THE ELECTRIC REDUCTION COMPANY LIMITED

by the

ONTARIO WATER RESOURCES COMMISSION

---

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M.P.P.

COMMISSIONERS

W. D. Conklin, Q.C. — H. E. Brown
D. A. Moodie — L. E. Venchiarutti

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ASSISTANT GENERAL MANAGERS

L. E. Owers — K. H. Sharpe
F. A. Voege — A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

---

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: A. C. Beattie
Operations Engineer: P. J. Osmond

801 Bay Street Toronto 5

# '65 REVIEW

During the past year the total operating cost per thousand gallons was 2.67¢ and the total cost which includes operating, interest on capital debt, debt retirement and reserve fund charges was 8.44¢ per thousand gallons.

The total flow during the past year was 3694.197 million gallons which is a slight decrease over the 1964 total. The average daily plant output during 1965 was 10.118 million gallons.

During 1965, in addition to the routine maintenance program carried out by the plant staff, a complete overhaul was performed on the 4000 GPM variable speed pump and one of the three Byron Jackson vertical turbine pumps in the low lift station. Also, a further modification was made to the high lift pump control panel which now provides a more efficient surveillance of high lift pumping conditions.

An inspection and a subsequent cleaning of the crib structure and bellmouth was performed on the 48" plant intake during the past summer. In addition to this work, steel mats were placed on the filled slopes outside the crib structure in an effort to prevent a further buildup of gravel in the bellmouth. By reducing turbulence in the intake bellmouth it is hoped that the frazil ice problem which has been experienced during the winter months will diminish.

# GLOSSARY

| | |
|---|---|
| BTU | British Thermal Unit |
| flocculation | bringing very small particles together to form a larger mass (the floc) before settling |
| fps | feet per second |
| gpm | gallons per minute |
| lin. ft. | linear feet |
| mgd | million gallons per day |
| pH | a symbol for hydrogen-ion concentration; a pH test determines the intensity of the acidity or alkalinity of a water |
| ppm | parts per million |
| ss | suspended solids |
| SWD | side wall depth |
| TDH | total dynamic head (usually refers to pressure on a pump when it is in operation) |
| turbidity | a measurement of the amount of visible material in suspension in water |

# HISTORY
# 1957 - 1965

## INCEPTION

In 1957, the Town of Dunnville and the Ontario Water Resources Commission initiated plans for the construction of a modern water treatment plant.

In 1958, two industries, the Sherbrooke Metallurgical Company Limited and the Electric Reduction Company Limited, began expanding in the Port Maitland area. Both of these industries required large amounts of water for their manufacturing process.

The Commission coordinated the needs of the town and industries and the firm of Canadian British Engineering Consultants, Toronto, were hired to design the necessary facilities.

## CONSTRUCTION

Schwenger Construction Limited, Hamilton, began construction in October 1959 and by August 1960 the Division of Plant Operations took over partial operation of the plant. Complete operation of the project was achieved in November 1960.

## TOTAL COST

$2,567,923.33 as of December 31, 1965.



R. L. NEFF
SUPERINTENDENT

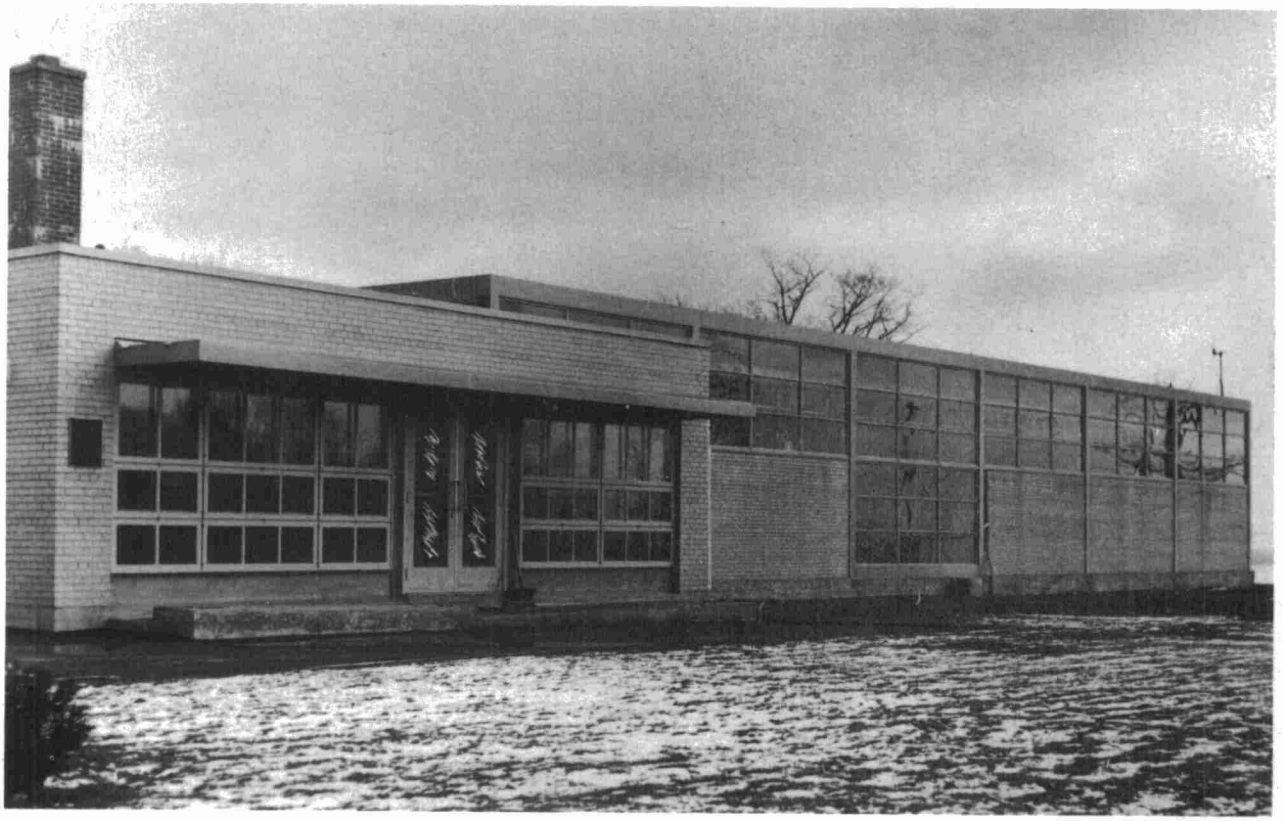
## Project Staff

| | |
|---|---|
| Assistant Superintendent: | Ross Root |
| Operators: | O. McLaughlin |
| | A. Clark |
| | J. Cown |
| | A. Miller |
| | R. Martineau |

### *COMMENTS*

The plant staff provide twenty-four hour operational supervision at the plant with preventative maintenance and repairs being carried out during the day shift. Casual labour is used to supplement the staff during peak work load periods and for planned renovations and repairs. The staff also perform special studies from time to time, the current project being an algae counting survey being carried out by O. McLaughlin. The results of Mr. McLaughlin's labours are forwarded to the OWRC head office for inclusion in a larger survey prepared annually.

During 1965, R. Root and O. McLaughlin completed their intermediate waterworks operators' course and obtained satisfactory standing. Mr. Root also attended a course providing instruction in the maintenance of gas burning equipment.



## Description of Project

INTAKE

The intake crib is located 1,300 feet out in Lake Erie in 25 feet of water. The raw water flows by gravity through the intake pipe which is laid in a rock cut on the lake bottom and is supported on sand bags filled with a mixture of sand and cement. The intake pipe terminates in the low lift pumping station pump wells.

LOW LIFT STATION

Just prior to entry to the pump wells, the raw water is screened by twin screens which may be removed one at a time for cleaning. The purpose of the screens is to remove any debris which would damage the low lift pumps.

The raw water is pumped to the microstrainers by three vertical turbine deep well pumps. These pumps are controlled by electrodes located in the clear well of the high lift station. At peak demand periods, all three pumps can operate in parallel.

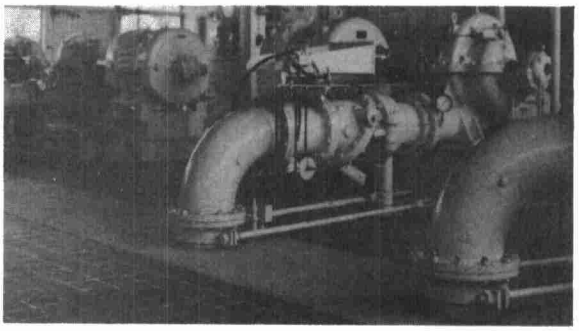
MICROSTRAINERS

Upon reaching the high lift station, the raw water passes through the microstrainers. A microstrainer consists of a revolving drum the circumference of which is covered with an extremely fine woven stainless steel cloth. The microstrainers remove most of the algae and other foreign material from the raw water as it passes through the fabric from the inside of the drum to the outside. The strained water then overflows from the microstrainer compartment into an effluent channel which flows into

one of two clear wells. The microstrainer fabric is continually flushed by treated water from a wash water pump which has an intake in the microstrainer effluent channel.

## CHLORINATION

Effluent from the microstrainers is stored in two clear wells located directly beneath the high lift pumping station. It is here that chlorine is added for disinfection. The chlorine is fed through proportional feed chlorinators the amount being determined by the rate of flow of raw water from the low lift station. Enough chlorine is added to maintain a slight residual in the water when it reaches the consumer's outlets. The chlorine equipment is installed in an isolated room in the high lift pumping station with the chlorine being stored in one ton cylinders in an adjacent roofed area. The cylinders are usually delivered to the plant in groups of seven and are moved as required from the storage area to the chlorinator room using a chain hoist sliding on a crane rail.

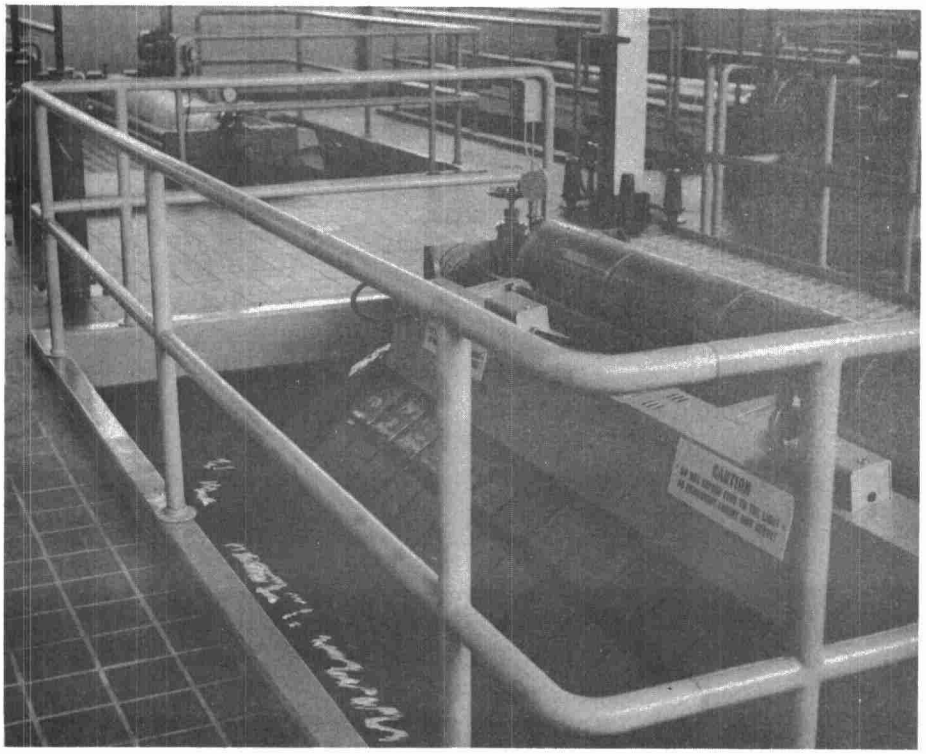


HIGH LIFT PUMPS

## DISTRIBUTION

Treated water is drawn from the clear wells and distributed to Dunnville and Port Maitland using seven high lift pumps. The pumps are controlled by flow. As the flow increases, more pumps are brought into service.

A 36 in. diameter transite main serves the Port Maitland industrial complex and a 16 inch diameter transite main supplies the Town of Dunnville with its requirements.



MICROSTRAINER ROOM

# PROJECT COSTS

Long Term Debt to OWRC

| | | |
|---|---|---|
| Dunnville | $ 546,753.63 | |
| Electric | $1109,650.98 | |
| Sherbrooke | 911,518.72 | |
| | | $2,567,923.33 |

Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965

| | | |
|---|---|---|
| Dunnville | $ 61,954.77 | |
| Electric | 127,585.59 | |
| Sherbrooke | 105,102.45 | |
| | | $ 294,642.81 |

The total cost to the participant during 1965 was as follows:

Net Operating

| | | |
|---|---|---|
| Dunnville | $ 18,337.97 | |
| Electric | 44,003.25 | |
| Sherbrooke | 36,144.12 | $ 98,485.34 |

Debt Retirement

| | | |
|---|---|---|
| Dunnville | $ 11,033.49 | |
| Electric | 22,392.76 | |
| Sherbrooke | 18,394.44 | $ 51,820.69 |

Reserve

| | | |
|---|---|---|
| Dunnville | $ 3,602.01 | |
| Electric | 7,520.57 | |
| Sherbrooke | 6,177.74 | $ 17,300.32 |

Interest Charges

| | | |
|---|---|---|
| Dunnville | $ 30,667.73 | |
| Electric | 62,242.96 | |
| Sherbrooke | 51,113.89 | $ 144,024.58 |
| TOTAL | | $ 311,630.93 |

## RESERVE ACCOUNT

| | | |
|---|---|---|
| Balance at January 1, 1965 | | |
| Dunnville | $ 15,262.74 | |
| Electric | 31,729.66 | |
| Sherbrooke | 26,152.72 | $ 73,145.12 |
| Deposited by Participant | | |
| Dunnville | $ 2,880.71 | |
| Electric | 6,008.16 | |
| Sherbrooke | 4,931.71 | 13,820.58 |
| Interest Earned | | |
| Dunnville | $ 885.00 | |
| Electric | 1,833.97 | |
| Sherbrooke | 1,286.38 | 4,005.35 |
| | | $ 90,971.05 |
| Less Expenditures | | |
| Dunnville | $ 1,465.81 | |
| Electric | 3,516.37 | |
| Sherbrooke | 2,898.53 | 7,880.71 |
| Balance at December 31, 1965 | | |
| Dunnville | $ 17,562.64 | |
| Electric | 36,055.42 | |
| Sherbrooke | 29,472.28 | |
| | | $ 83,090.34 |

## MONTHLY OPERATING COSTS

| MONTH | TOTAL EXPENDITURE | PAYROLL | CASUAL PAYROLL | FUEL | POWER | CHEMICAL | GENERAL SUPPLIES | EQUIPMENT | REPAIRS & MAINTENANCE | SUNDRY | WATER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JAN | 3607.63 | 3384.00 | | 65.56 | | 42.00 | 20.27 | 55.73 | | 55.22 | (15.15) |
| FEB | 8281.04 | 2805.84 | | 220.48 | 3273.64 | 910.00 | 49.14 | 193.91 | 94.04 | 733.99 | |
| MARCH | 7160.90 | 2722.58 | | 195.78 | 3164.55 | | 95.69 | 20.81 | 859.23 | 102.26 | |
| APRIL | 6692.79 | 3011.45 | | 166.43 | 3257.89 | 13.00 | 32.23 | | 24.87 | 202.07 | (15.15) |
| MAY | 10402.83 | 3999.51 | 133.82 | 144.39 | 3411.38 | | 143.04 | 2294.92 | 29.51 | 246.26 | |
| JUNE | 9925.60 | 2662.98 | 243.12 | 44.68 | 3409.44 | | 106.36 | 797.82 | 166.09 | 2495.11 | |
| JULY | 7095.63 | 2662.98 | 172.98 | | 3632.80 | 52.50 | 156.05 | | 353.13 | 80.34 | (15.15) |
| AUG | 8375.70 | 2720.97 | 292.38 | | 3505.40 | 910.00 | 191.69 | | 621.77 | 133.49 | |
| SEPT | 7081.23 | 2885.67 | 144.12 | | 3533.35 | | 227.81 | | 222.64 | 67.64 | |
| OCT | 10956.85 | 4145.02 | 291.78 | 14.14 | 3785.87 | | 148.89 | 250.83 | 372.79 | 1947.53 | |
| NOV | 8134.34 | 2913.78 | 245.37 | 27.40 | 3713.08 | | 226.76 | 302.64 | 281.67 | 453.41 | (29.77) |
| DEC | 10770.80 | 2832.72 | 21.21 | 68.61 | 3449.61 | 1228.00 | 289.27 | 29.85 | 2521.52 | 330.01 | |
| TOTAL | 98485.34 | 36747.50 | 1544.78 | 947.47 | 38137.01 | 3155.50 | 1687.20 | 3946.51 | 5547.26 | 6847.33 | (75.22) |

BRACKETS INDICATE CREDIT

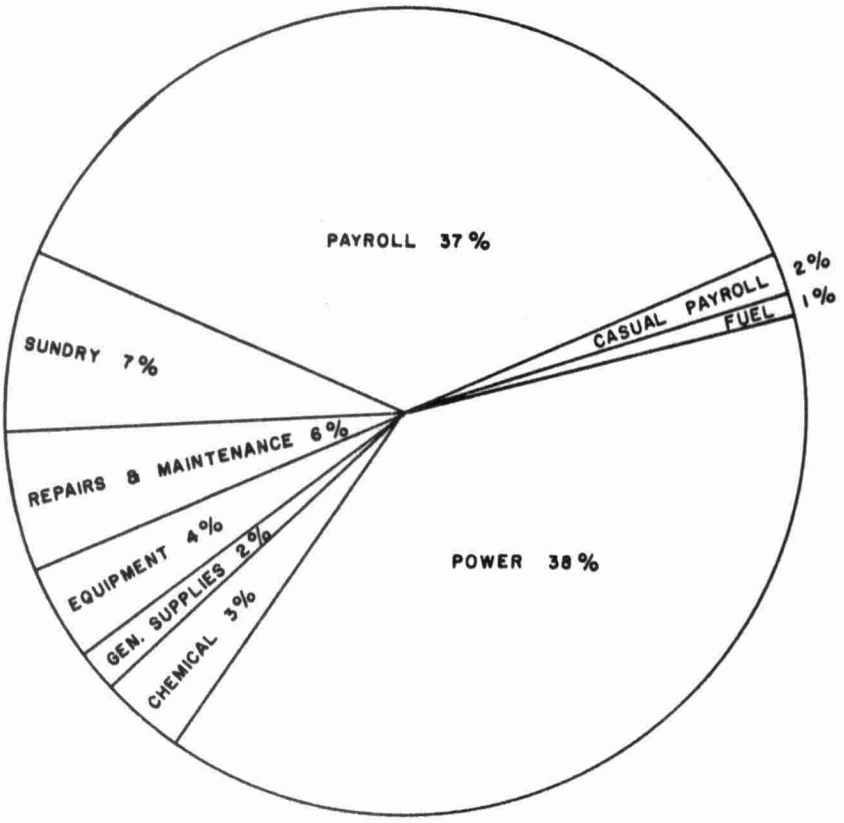
## SUMMARY OF WATER COSTS

| Year | M. G. Treated | Operating Cost | Operating Cost per 1,000 gallons | Total Cost | Total Cost per 1,000 gals. |
|---|---|---|---|---|---|
| 1961 | 2245.838 | $71,428.00 | 3.18¢ | $276,047.37 | 12.29¢ |
| 1962 | 3214.853 | 85,564.88 | 2.66¢ | 297,494.48 | 9.25¢ |
| 1963 | 3726.935 | 95,458.82 | 2.56¢ | 309,179.48 | 8.29¢ |
| 1964 | 3719.568 | 99,095.96 | 2.66¢ | 312,663.35 | 8.40¢ |
| 1965 | 3692.889 | 98,485.34 | 2.67¢ | 311,630.93 | 8.44¢ |

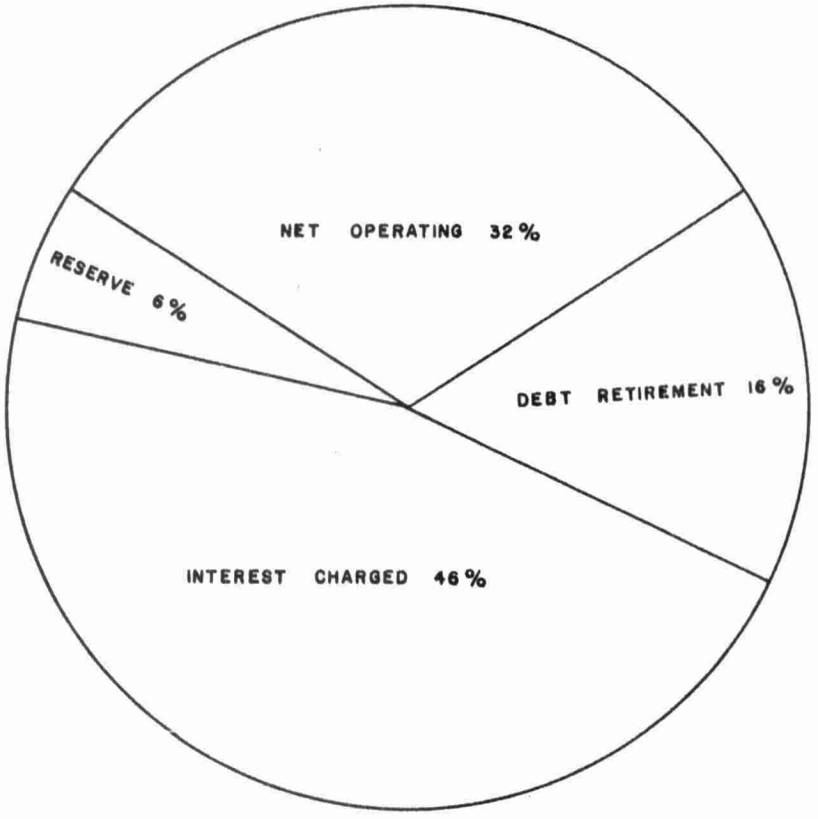
## COST TO EACH PARTICIPANT IN 1965

| Participant | M. G. Used | Operating Cost | Operating Cost per 1,000 gallons | Total Cost | Total Cost per 1,000 gals. |
|---|---|---|---|---|---|
| Town of Dunnville | 329.689 | $18,337.97 | 5.56¢ | $ 63,641.20 | 19.30¢ |
| Electric Reduction | 1352.794 | 44,003.25 | 3.25¢ | 136,159.54 | 10.06¢ |
| Sherbrooke Metallurgical | 2010.406 | 36,144.12 | 1.80¢ | 111,830.19 | 5.56¢ |

## 1965 OPERATING COSTS

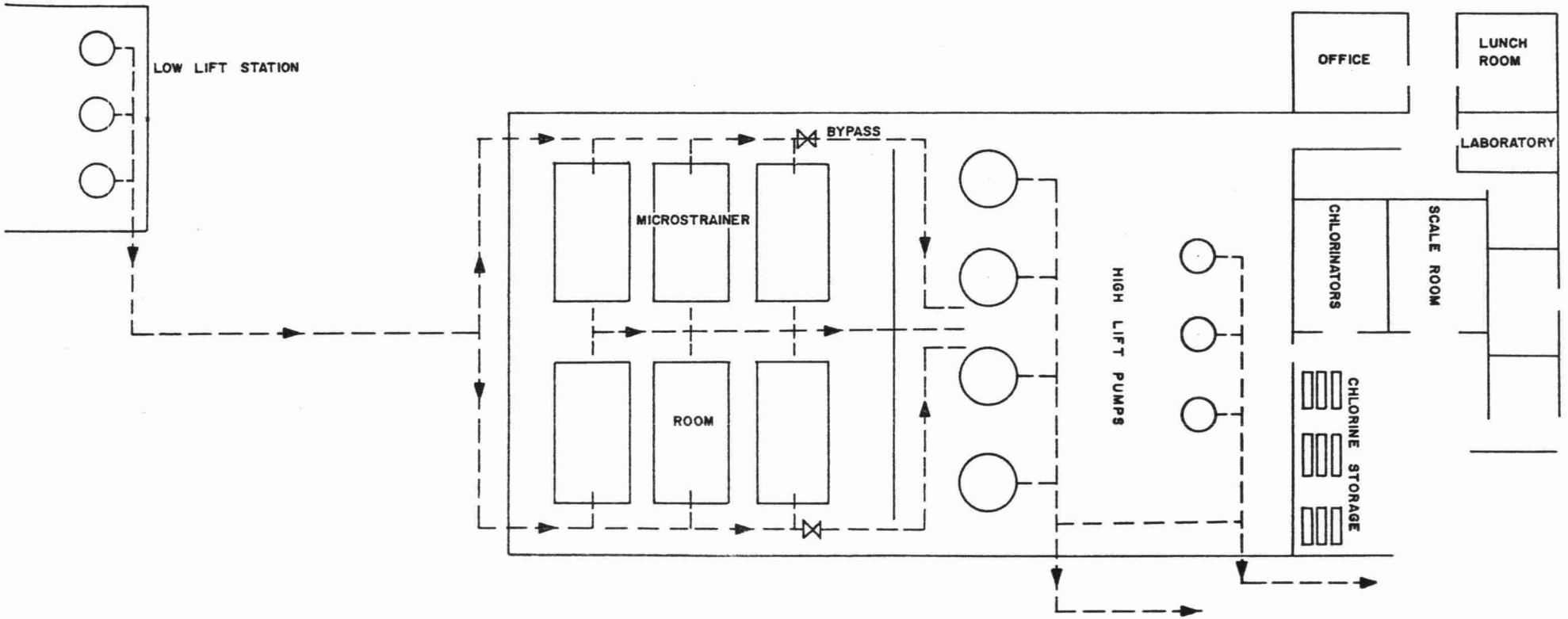



## TOTAL ANNUAL COST



# Technical Section

# DUNNVILLE REGIONAL WATER TREATMENT PLANT



# Design-Data

DESIGN CAPACITY OF PLANT

20.5 MGD.

INTAKE

48" asbestos bonded corrugated metal.

SCREENING FACILITIES

Four removeable screens 5'6" square having 3/8" openings.

Each screen can be removed for cleaning by individual rocket hoists by David Round & Son.

LOW LIFT PUMPS

Three Byron Jackson vertical turbine pumps. Each pump is rated at 5700 GPM @ 38 ft. TDH.

Three Westinghouse encapsulated line start induction motors. Each motor is rated at 75 HP.

MICROSTRAINERS

Six 10 ft. long x 10 ft. diameter machines as manufactured by Glenfield & Kennedy. All machines are equipped with Mark I fabric having a maximum opening of 35 microns.

WASH WATER PUMPS

Two Babcock-Wilcox & Goldie McCulloch centrifugal pumps rated at 500 GPM @ 100 ft. TDH.

Two Westinghouse encapsulated life-line motors rated at 20 HP.

CLEAR WELLS

Two compartments having a total capacity of 200,000 Imperial gallons. Detention time at 20.5 MGD = 18.25 minutes.

HIGH LIFT PUMPS

One Wheeler Economy Pump - 1200 GPM @ 135 ft. TDH driven by a 50 HP English electric motor.

Two Wheeler Economy Pumps - 1440 GPM @ 230 ft. TDH.

Four horizontal drive Worthington pumps. These pumps are rated such that when any three are operating in parallel, they will produce 4,000 GPM each at 220 ft. discharge pressure.

Three pumps are driven by 350 HP Associated Electrical Industries constant speed motors. The fourth pump is driven by a 350 HP synchronous motor by English electric connected through a Dynamatic Eddy Current Coupling.

CHLORINATION

Two Wallace & Tiernan Series A-711 variable vacuum control chlorinators capable of metering 2,000 lbs. of chlorine per day.

Storage facilities are provided for 15 one ton cylinders.

DISTRIBUTION SYSTEM

TO TOWN OF DUNNVILLE

23,000 feet of 16" diameter asbestos cement pipe which supplies a maximum of 2,400 GPM to either the filtration plant or directly to the town distribution system.

TO PORT MAITLAND

20,000 feet of 36" diameter asbestos cement pipe pumped directly to the industrial distribution system in Port Maitland.

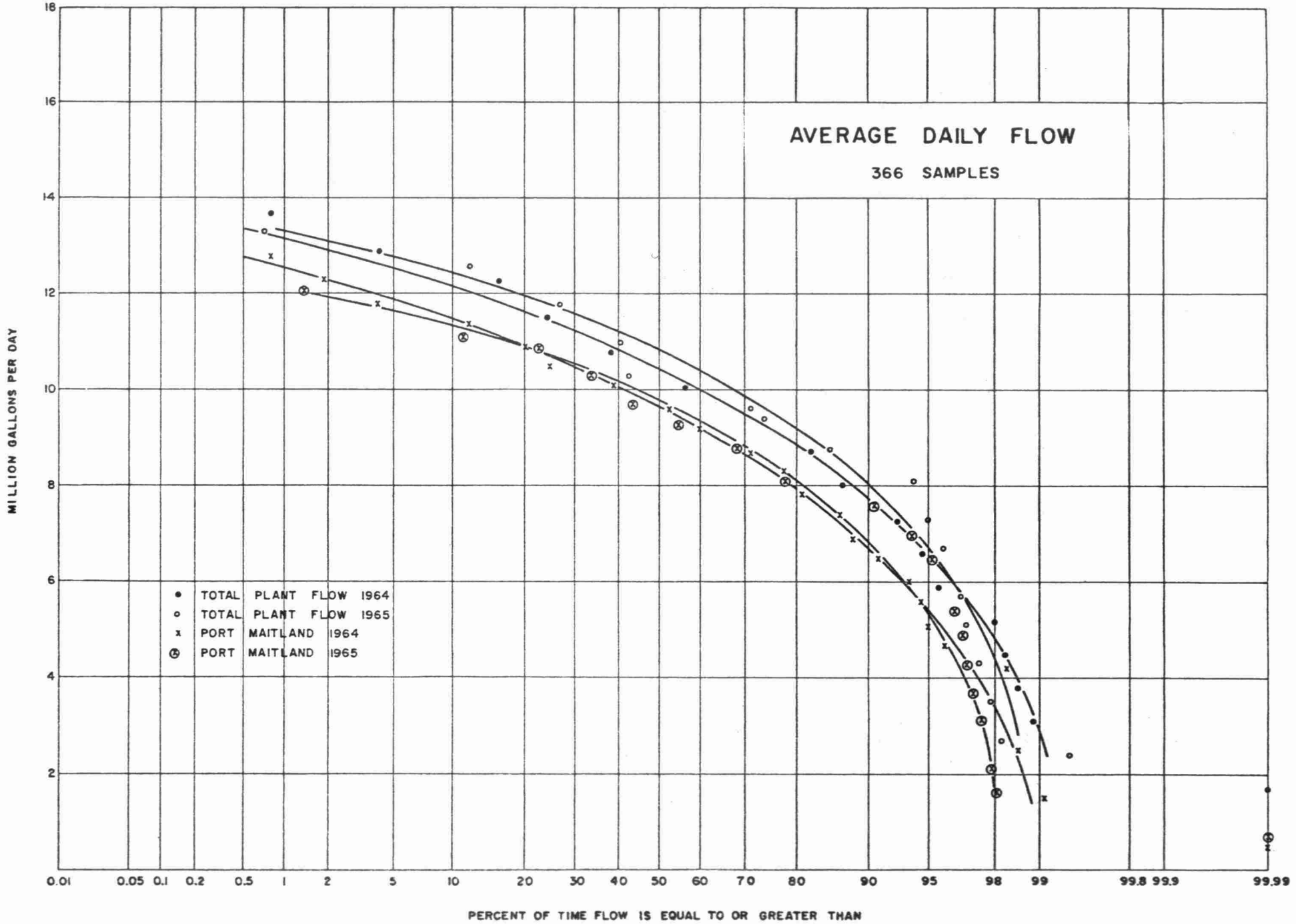
# Process Data

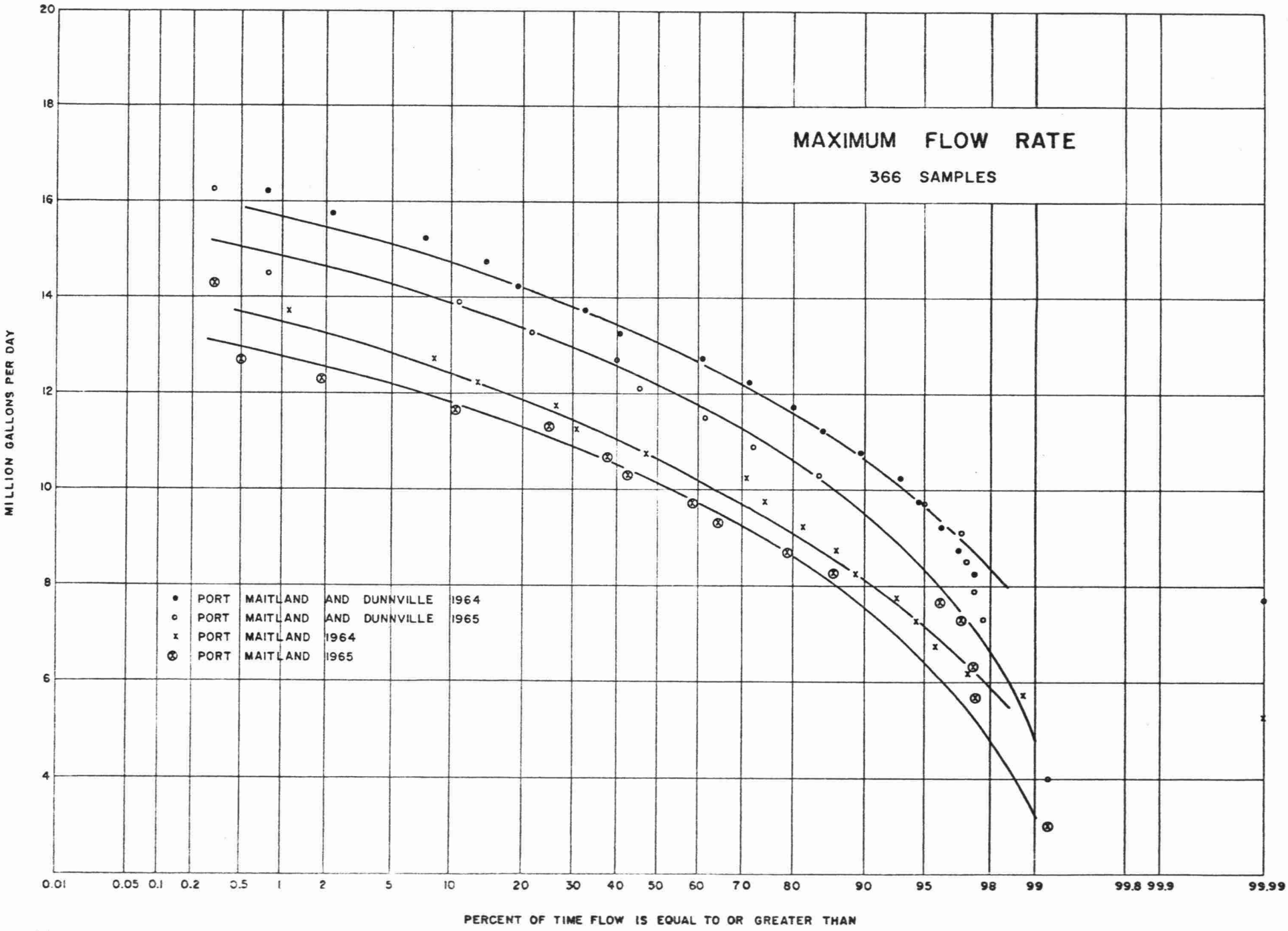
## GENERAL

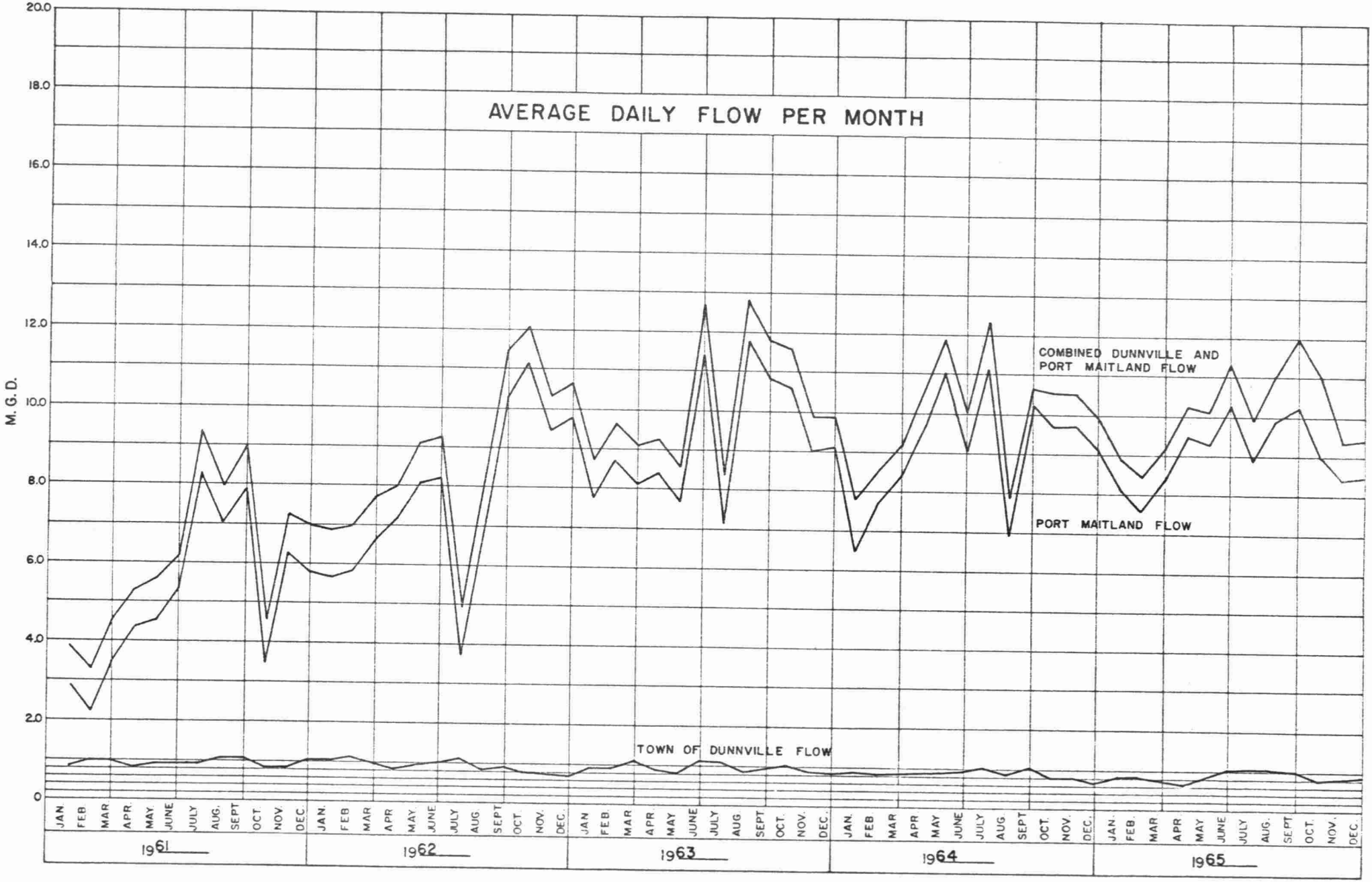
The treatment of water at the Dunnville plant consists of microstraining to remove such things as algae and gross solids, and disinfection by the addition of chlorine. The following data provides information regarding the output of the plant, the quality of the raw water, the quality of the treated water and chlorine dosages necessary to maintain safe water. The quality of the water is discussed using such terms as filterability and turbidity. An effort is made to define the meaning of these terms and graphs have been drawn to indicate the frequency of occurrence of various readings.

## FLOW

During 1965 a total of 3694.197 million gallons of water were pumped to the Port Maitland Industries and the Town of Dunnville. This was a decrease of approximately 0.7% from the 1964 total flow. September was the peak month for total flow with an average daily flow of 12.153 million gallons. The average daily plant output for 1965 was 10.118 million gallons with the peak daily output of 13.252 million gallons occurring on July 6. The minimum daily flow of 1.811 million gallons occurred on August 1 during shutdown by the Industries.

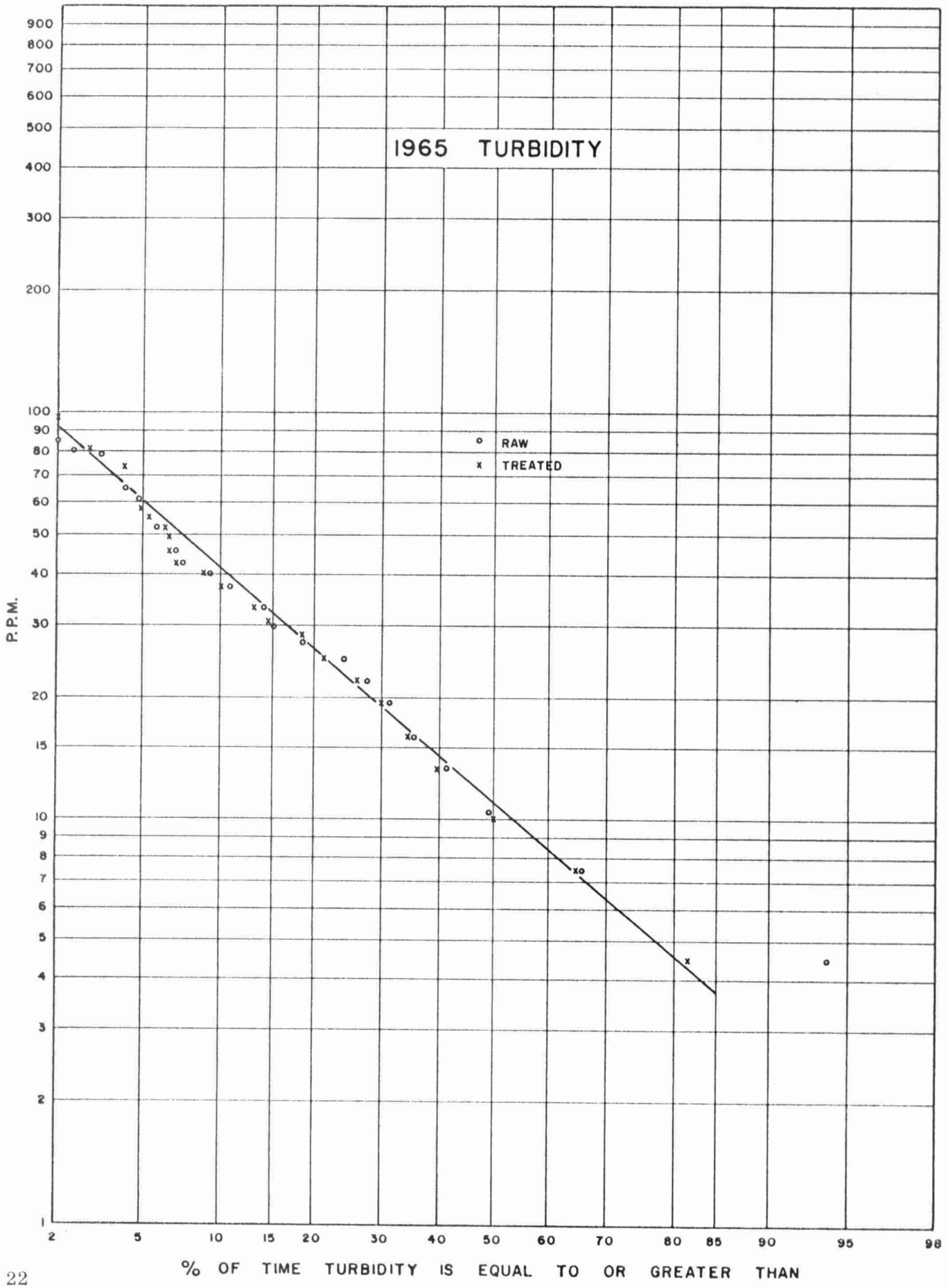

AVERAGE DAILY FLOW
366 SAMPLES
MILLION GALLONS PER DAY
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN
TOTAL PLANT FLOW 1964
TOTAL PLANT FLOW 1965
PORT MAITLAND 1964
PORT MAITLAND 1965
18
16
14
12
10
8
6
4
2
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99


MAXIMUM FLOW RATE
366 SAMPLES
MILLION GALLONS PER DAY
PERCENT OF TIME FLOW IS EQUAL TO OR GREATER THAN
PORT MAITLAND AND DUNNVILLE 1964
PORT MAITLAND AND DUNNVILLE 1965
PORT MAITLAND 1964
PORT MAITLAND 1965
20
18
16
14
12
10
8
6
4
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99


AVERAGE DAILY FLOW PER MONTH
M. G. D.
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0
COMBINED DUNNVILLE AND PORT MAITLAND FLOW
PORT MAITLAND FLOW
TOWN OF DUNNVILLE FLOW
JAN. FEB MAR APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
1961
1962
1963
1964
1965

## MONTHLY FLOWS

| Month | Total Flow MG | Dunnville Town MG | Electric Reduction MG | Sherbrooke Metallurgical MG |
|---|---|---|---|---|
| January | 277.837 | 25.007 | 99.555 | 153.275 |
| February | 235.806 | 23.126 | 97.225 | 115.455 |
| March | 282.905 | 23.865 | 110.085 | 148.955 |
| April | 306.796 | 22.556 | 107.099 | 177.141 |
| May | 314.600 | 25.730 | 108.767 | 180.103 |
| June | 341.927 | 31.297 | 124.131 | 186.499 |
| July | 308.283 | 32.363 | 107.478 | 168.442 |
| August | 341.641 | 32.001 | 117.522 | 192.118 |
| September | 364.607 | 31.277 | 124.211 | 209.119 |
| October | 349.003 | 29.003 | 125.437 | 194.563 |
| November | 278.121 | 26.061 | 109.511 | 142.549 |
| December | 291.363 | 27.403 | 121.773 | 142.187 |
| Total | 3692.889 | 329.689 | 1352.794 | 2010.406 |
| % of Total | 100 | 8.93 | 36.63 | 54.44 |
| Average Daily | 10.118 | 0.903 | 3.706 | 5.508 |


1965 TURBIDITY
o RAW
x TREATED
P.P.M.
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% OF TIME TURBIDITY IS EQUAL TO OR GREATER THAN

TURBIDITY (see graph at left)

The turbidity of water is a measure of the interference presented by suspended matter to the passage of light. This measurement therefore indirectly measures the suspended matter such as clay, silt, finely divided organic matter and microscopic organisms present in the water.

The microstrainers at the Dunnville Regional Treatment Plant are designed to remove only the larger micro-organisms, particularly algae. It can be seen from the accompanying graph on turbidity measurements that the treatment process does not significantly reduce the turbidity of the raw water. It may be deduced from these results that the major source of turbidity in the raw water is caused by substances smaller than can be removed by the microstrainers.

The U. S. Public Health Standard for drinking water specifies a limit of 10 parts per million. At the Dunnville plant the treated water met this standard only 50% of the time.

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BACTERIOLOGICAL ANALYSIS

A total of 202 samples for bacteriological analysis were submitted to the OWRC Laboratory during 1965. Of these samples 51 were of the raw water as taken from the low lift station and 151 were of the treated water as collected from the Sherbrooke Metallurgical plant, the end of the main at the Dunnville P. U. C. and the Grandview School in Dunn Township. Of the 151 samples of treated water, 149 were classed as Grade "A" or satisfactory water.

None was classed as Grade "B" - water where the pollution present is not sufficient to regard it as unfit for drinking.

Two of the treated samples were classed as Grade "C" or unsafe for human consumption. However, in cases such as this when a small percentage of the total samples were Grade "C", it is common to assume that the sample was contaminated during the sampling procedure.

## ALGAE ENUMERATION AND IDENTIFICATION (see graph at right)

Certain species of algae in drinking water may be responsible for obnoxious tastes and odours. Although there are no pathogenic species of algae, their decomposition products can produce illness in animals which drink the water during periods of heavy algal decay. For these reasons an attempt is made to remove algae from the Lake Erie water by microstraining at the Dunnville Regional Water Treatment Plant.

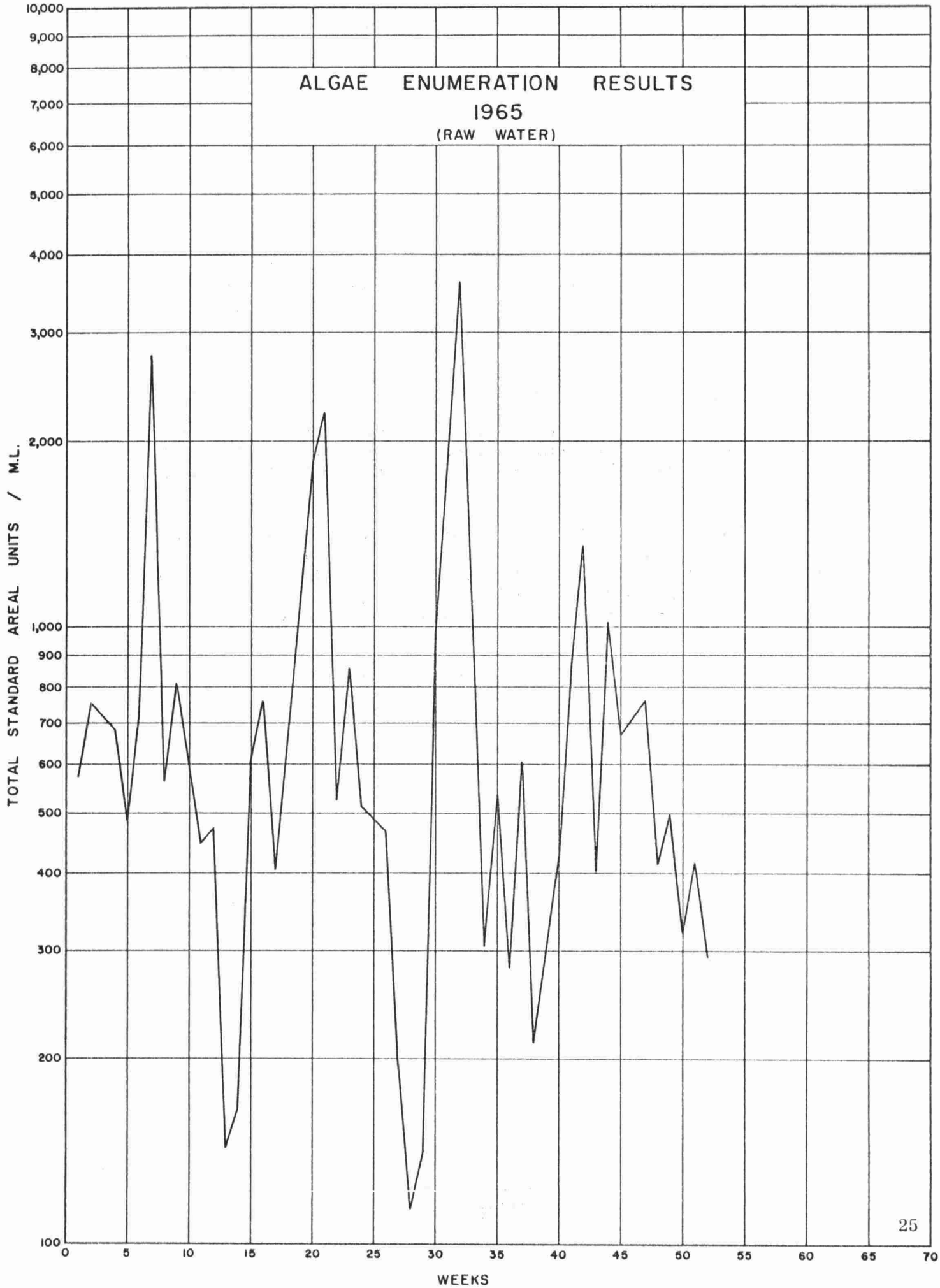
Algae enumeration and identification are performed on the raw and microstrained water by the plant staff. The accompanying graph shows the seasonal variations in algae.

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## CHEMICAL ANALYSIS

A total of 51 samples were submitted to the OWRC Laboratory for chemical analysis during 1965. Approximately half of these samples were of the raw water and half were of the treated water. There is virtually no change between the treated and raw water due to the dissolved nature of the chemicals and the yearly average values as listed below may be considered as applicable to either raw or treated water. Also included in the table below are normally accepted standards for good quality water.

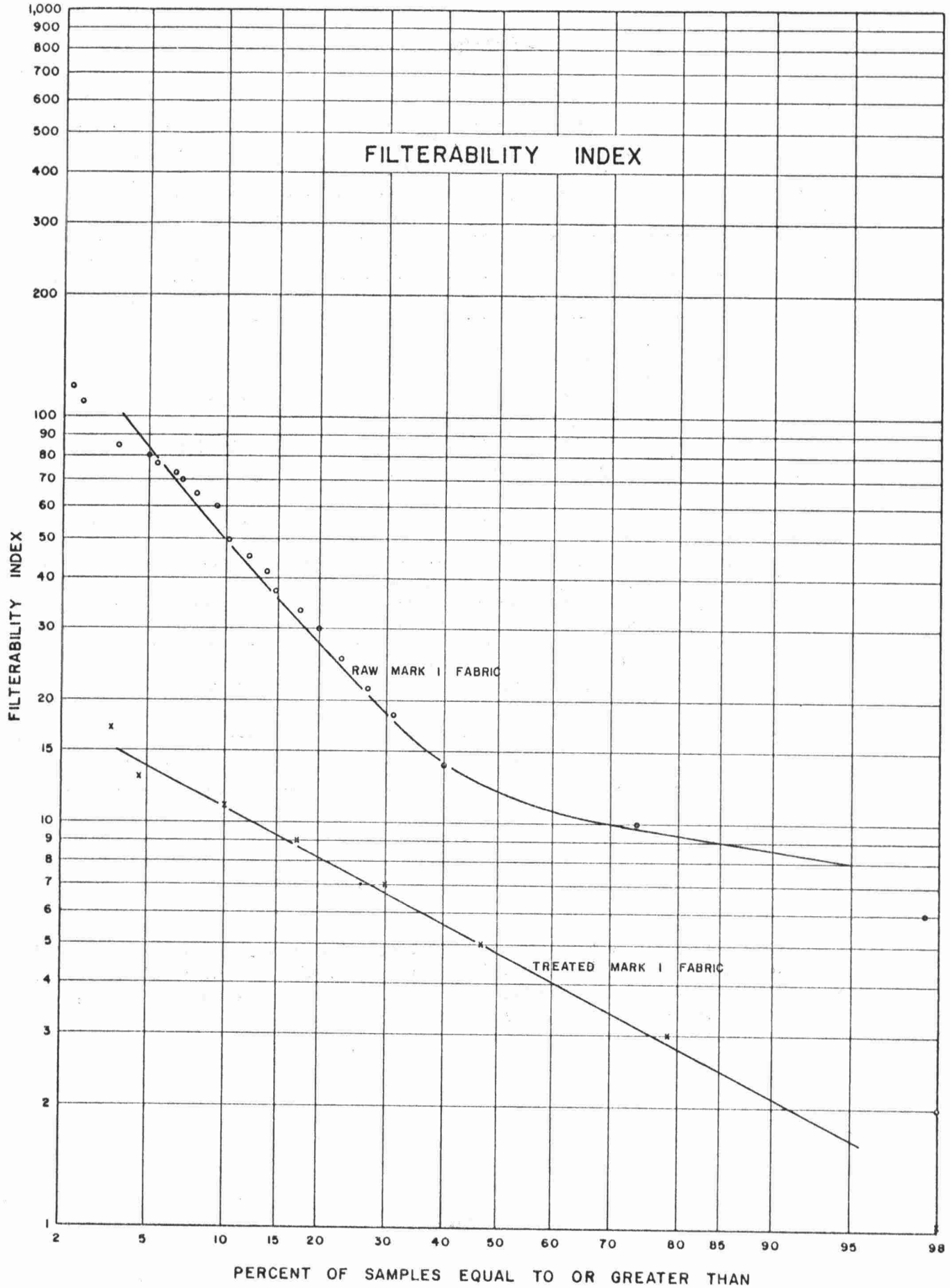
| Description | Hardness As $CaCO_3$ (PPM) | Alkalinity As $CaCo_3$ (PPM) | Iron As Fe (PPM) | Chloride As Cl (PPM) | pH at Lab | Colour in Hazen Un. | Phenols in (ppb) | Sulphates as $SO_4$ (PPM) |
|---|---|---|---|---|---|---|---|---|
| Standards | < 100 | 30 to 100 | < .03 | < 350 | 6.7 to 8.5 | < 15 | <2 | < 250 |
| (Yearly Avg.) Dunnville Plant | 139 | 100 | 0.50 | 26 | 8.7 to 7.7 | < 6 | <1 | 30 |


ALGAE ENUMERATION RESULTS
1965
(RAW WATER)
TOTAL STANDARD AREAL UNITS / M.L.
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
900
800
700
600
500
400
300
200
100
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
WEEKS

## FILTERABILITY

The filterability index has been developed in connection with microstrainers in order to measure their ability to filter water. The index is affected by the type of microstrainer fabric used and the quality, particularly turbidity, of the water to be filtered.

For a given fabric an increase in the index indicates a poorer quality of water which decreases the capacity of the microstrainers. For a given quality of water the index will increase with an increase in the fineness of the microstrainer fabric. The microstrainers at the plant are equipped with Mark I fabric having an aperture opening of 35 microns with 80,000 apertures per square inch.


FILTERABILITY INDEX
FILTERABILITY INDEX
1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
RAW MARK I FABRIC
TREATED MARK I FABRIC
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PERCENT OF SAMPLES EQUAL TO OR GREATER THAN

## CHLORINATION

| MONTH | DOSAGE PPM | RESIDUAL PPM | CHLORINE USED POUNDS |
|---|---|---|---|
| JANUARY | 0.81 | 0.40 | 2246 |
| FEBRUARY | 1.10 | 0.43 | 2612 |
| MARCH | 0.66 | 0.40 | 1868 |
| APRIL | 0.79 | 0.42 | 2424 |
| MAY | 0.84 | 0.40 | 2658 |
| JUNE | 0.81 | 0.40 | 2758 |
| JULY | 0.81 | 0.40 | 2510 |
| AUGUST | 0.83 | 0.45 | 2852 |
| SEPTEMBER | 0.93 | 0.50 | 3402 |
| OCTOBER | 1.00 | 0.50 | 3474 |
| NOVEMBER | 0.95 | 0.50 | 2634 |
| DECEMBER | 0.96 | 0.50 | 2788 |
| TOTAL | - | - | 32226 |
| AVERAGE | 0.87 | 0.44 | 2686 |

## COMMENTS

Chlorination of the water is required for disinfection and resulting destruction of pathogenic organisms. An added benefit is the partial elimination of undesirable tastes and odours. A combined chlorine residual of 0.5 ppm after 15 minutes retention is maintained in the treated water by post-chlorination.

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# CONCLUSIONS

During the year 1965, the Dunnville Regional Water Treatment plant was efficiently operated and maintained by the plant staff. One major breakdown occurred, that being the Byron Jackson low lift pump. This breakdown did not result in an interruption in the service to the three participants. There were however several interruptions during the winter months due to frazil ice clogging the intake.

Several improvements were made to the plant grounds during the year including the addition of shrubs and replacement of asphalt sidewalks with concrete. The staff embarked on an extensive interior painting program due to be completed in 1966.

The frazil ice problem is stilloutstanding. However, it is hoped that the intake cleaning will assist in reducing this problem. No other severe problems are anticipated at this time.

TD/227/D86/D86/1965/MOE
Ontario Water Resources Co
Dunnville (regional)
water treatment plant asmz
annual report c.1 a aa
1965

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